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ABSTRACT

This monograph discusses educational issues related to information technology by drawing on the expertise of community college Teaching Excellence Award winners. It offers a basic framework for using information technology in the community college to improve and expand learning while holding fast to a focus on community. Faculty point out that the connection capabilities made possible by information technology enhance interactive and collaborative learning. In addition, students' use of technology tools to access and analyze information help foster critical thinking and the construction of knowledge. Analysis of study findings from qualitative and quantitative data, derived from the responses of almost 2,000 community college faculty, revealed that faculty perceptions regarding information technology and instruction can be divided into three conceptual categories relating to technology, learning, and community. This monograph explores study results pertaining to each of these concepts and places them in the broader context of research and practice in the national higher education scene. (Contains 27 references.) (AS)

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TECHNOLOGY, LEARNING, AND COMMUNITY (TLC)

Perspectives from Teaching Excellence Award Recipients

TLC

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TECHNOLOGY, LEARNING, & COMMUNITY (TLC)

Perspectives from Teaching Excellence Award Recipients

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November 1998

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Mark David Milliron
Cindy L. Miles

Technology, Learning, and Community (TLC): Perspectives from Teaching Excellence Award Recipients

> *The cold winds of criticism and the icy demands for accountability have dominated the closing decades of this century. But the new century holds promise of a fresh new spring for educators, and I see creativity and innovation blooming everywhere, but especially in the nation's community colleges. (Cross, 1998, p. 5)*

Creativity and innovation are hallmarks of the best community college faculty. Studies on community college education demonstrate that our faculty consider teaching to be their primary mission (Baker, Roueche, & Gillett-Karam, 1990; Roueche & Baker, 1987) and that they approach this mission as champions of a range of innovations, such as service learning, writing across the curriculum, cooperative learning, and learning communities (Cross, 1998; Exley, 1995; O'Banion, 1997a). As the current Learning Revolution amplifies our focus on educational outcomes (Barr & Tagg, 1995; Cross, 1998; O'Banion, 1997a, 1997b, 1998; Oblinger & Rush, 1997, 1998), however, community college faculty are newly challenged to find creative and meaningful methods to inspire student learning.

The forceful presence of technology in our lives adds further challenges and opportunities for faculty. Information technology has infused the educational enterprise, offering community college faculty a dazzling array of instructional tools and techniques (Anandam, 1998; Gilbert, 1997; Green, 1997). Technology to support instruction is hardly a new development, however. What were once revolutionary technologies are now a common part of almost every classroom experience, so much so that we hardly notice most of them. Consider one everyday technical resource in a standard classroom–electric lights. Each time we switch on the lights in a classroom, untold hours of

research, development, trial, and refinement are reflected. The design used in most of today's light bulbs is based on technology that is 120-years old (half that, if fluorescent). Despite its earlier development, this technology has been in standard use in schools nationwide only in the last half of this century. In fact, comprehensive use was not in place until the last thirty years, after a focused national effort was administered by the Rural Electrification Administration (REA) to create an elaborate network to provide power to all parts of the country. In the history of higher education, universal access to this fundamental technology is somewhat recent, but it is hard for us to imagine a classroom today without electric lights.

We can draw several parallels between the electrification of classrooms and the current "wiring" of schools for the Internet. Just as electricity was a conduit for progress earlier this century, the Internet is heralded as the vehicle to bring education into the Information Age. Just as electrification spread rapidly in highly populated areas but was slow to reach smaller, poorer, or more rural schools, the "Information Superhighway" was quick to connect larger communities, but it is slow to arrive at institutions with fewer resources. And, like the REA campaign to bring light to all American communities, we are in the midst of a national movement to provide Internet access to all schools–the Net Day campaign, which enlists community volunteers to donate time, money, and other resources to wire schools and connect them with the Internet. It is interesting to note that both the electric light and the Internet offer instructors more flexibility and extend student access to learning tools and content. In this current connectivity venture, we can only hope that the Internet soon becomes so stable, useful, and common that we give it as little thought as we give to turning on the lights.

Indeed, in many ways the new millennium seems to promise a "new spring for educators." We will have more tools at our disposal, enhanced access to learning for students, and improved

information on which to base key instructional decisions. At the same time that information technology offers more options, independence, and creativity for teachers and learners, it also stresses our educational communities with internal demands and external competition. To attain the true benefits of technology in coming years, we must grapple with these ambiguities and consider the full implications of technology use, both contributive and disruptive, on teaching and learning in two-year institutions. This monograph is intended to fuel conversations about educational complexities and opportunities related to information technology by drawing on the expertise of community college teaching excellence award winners. It offers a basic framework for approaching the use of information technology in the community college based on research capturing the voices of award-winning faculty who shared their views on how to explore and embrace the **technology** available, and target it toward improving and expanding **learning**, while holding fast to a focus on **community**.

Studying Information Technology Use Among Community College Faculty

This monograph weaves findings from community college research and practice with data from a national study that began in 1997 at the National Institute for Staff and Organizational Development's (NISOD) annual International Conference on Teaching and Leadership Excellence, sponsored by The University of Texas at Austin. Each year, NISOD asks the CEOs of more than 600 member institutions to name their exemplary faculty to be recognized for teaching excellence. Colleges select faculty worthy of national recognition based on individual institutional criteria. More than 300 of the instructors selected each year attend the annual NISOD conference, where they are recognized as Teaching Excellence Award recipients. At the time of this study, NISOD and The University of Texas had recognized almost 7,000 faculty over the seven years of the program.

As part of a broader study on teaching excellence in the community college, these nationally recognized instructors were identified as a useful population from which to draw data on the use of information technology in community college instruction. This purposeful sampling (Patton, 1990) of faculty was chosen for their demonstrated ability in the classroom rather than for any savvy they might demonstrate with technology. Award-winning teachers were purposefully selected over technology advocates or "true believers." The research goal was to solicit perspectives from a collection of successful community college teachers who offered a high-quality instructional perspective regarding the application of technology to teaching and learning.

An Innovative and Interactive Study Design

This monograph focuses most attention on the rich findings drawn from the faculty in our study; however, for those interested in the study design and procedures, we provide the following brief overview of our methods. The study was conducted in a two-stage format, blending interactive qualitative techniques and standard quantitative survey methodologies. The "hybrid vigor" (Miles & Huberman, 1994, p. 310) of such mixed-method research techniques has been widely noted (Miller & Crabtree, 1994, Rossman & Wilson, 1991, Salomon, 1991). In this study we called on the strengths of each methodological approach. First, we used an interactive qualitative method to explore the range of instructional technology applications and to solicit faculty perspectives about the positive and negative effects they associate with technology applications. Then, we turned to quantitative survey methods to test the agreement with these findings within a broader population of award-winning faculty and to construct a priority ranking of faculty views on the issues identified in the first study stage. The resulting triangulation of methods and sources contributed to the quality and rigor of the analysis. Following are details of the two study stages and a summary of key findings.

Stage One: Interactive Qualitative Focus Groups. The initial qualitative research stage of the study began with a series of two-hour focus group sessions held with teaching excellence award winners at the 1997 NISOD conference. Five focus group sessions were held, each with 45 to 50 faculty participants, for a total of 230 participants. The average age of focus group participants was 50; approximately 53 percent of the participants were male, and 47 percent were female. In each focus group, faculty participated in a process of collaborative brainstorming and idea clustering known in Total Quality Management circles as affinity diagramming. Affinity diagramming is a group process for organizing large amounts of language or textual information. Originally designed for strategic organizational management and planning (Brassard, 1989), affinity diagramming was used in this study as an interactive group data collection and analysis process. Faculty generated responses to research questions but also participated in group analysis of these responses, grounding the study findings in their collective experiences while giving voice to their individual perspectives.

For each focus group, seven questions were posted on the walls of a large conference room, two of which related specifically to technology use in instruction. The technology-focused questions were simple:

In what ways do you use information technology in instruction?

What do you see as the key issues (positives or problems) in the use of technology in instruction?

We reviewed the questions briefly with each group and asked faculty to write their responses on self-adhesive notecards (i.e., "post-it notes") and to post their responses next to the relevant questions on the wall, listing only one answer per card. We turned on low-level music and encouraged faculty to move around the

room as desired. The brainstorming and posting process took approximately 45 minutes and generated high-energy movement and discussion.

After the brainstorming process, we divided the faculty into seven small groups–one for each question–to arrange the responses to each question into thematic clusters (affinity groups) that made sense together. This clustering process took another 30 to 45 minutes, after which the small groups reported on their findings. Finally, we facilitated discussion during which faculty members explained their responses and provided more depth to their written comments. The discussions were videotaped for secondary analysis.

After all the focus group sessions were complete, a research team lead by the authors reviewed the affinity groups for each question from each session and created a master set of thematic clusters. The complete interactive qualitative methodology yielded 907 comments coded into 19 categories for the two questions on technology.

Stage Two: Quantitative Survey Method. In the second study stage, a questionnaire was produced and distributed that listed the research questions and thematic clusters (expressed as statements) generated by faculty in stage one, with an example comment for each thematic statement. The questionnaire asked respondents to record their level of agreement with each statement by choosing one item from a variation of a standard seven-point Likert scale:

YES! Yes yes ? no No NO!

In addition, respondents were asked to priority rank their responses by identifying the top three statements with which they most agreed.

The survey was sent to the entire population of 6,958 NISOD Teaching Excellence Award recipients. Several follow-up efforts were made to find addresses of faculty who had moved since receiving their awards and to locate those who had retired. A total of 1,670 faculty responded to the survey (a response rate of 24 percent). The demographics of survey respondents were similar to those of the focus groups–the average age of survey respondents was 50, 56 percent were male, and 44 percent were female. Their community college teaching experience averaged 17 years, and almost one in four planned to retire within five years.

Findings Focused on Teaching, Learning, and Community

In general, findings from the survey validated the work of the focus groups and provided additional insights into patterns of faculty perspectives on information technology applications in community college teaching and learning. Tables 1 and 2 (Appendix A) present a summary of the qualitative and quantitative responses to the two questions posed to study participants regarding the use of information technology in community college instruction.

Analysis of study findings from qualitative and quantitative data, derived from the responses of almost 2,000 award-winning community college faculty from around the world, revealed that faculty perceptions regarding information technology and instruction could be divided into three conceptual categories relating to *technology*, *learning*, and *community*. Study results pertaining to each of these concepts are explored in the following sections and placed in the broader context of discussions emerging from research and practice on the national higher education scene.

Technology

The information technology revolution. Even a cursory look at the explosion of literature and conference activity on the topic of information technology over the last ten years leads to the unavoidable conclusion that technology is transforming the educational enterprise. For example, the League for Innovation in the Community College's annual Conference on Information Technology (CIT) grew from 550 participants in its inaugural year in 1984 to more than 3,500 participants in 1997, making it the largest community college conference of any kind. Continued expansion of interest in this annual exposition of the use of technology to improve teaching and learning, student services, and institutional management is but one of many indicators that the integration of information technology throughout the institution is one of the most powerful trends in higher education. As interest in information technology has flourished, topics of discussion surrounding its application in colleges have evolved. Programs for the League's early technology conferences dealt chiefly with issues of administrative computing and technical infrastructures. One of the few instructional debates in the early years regarded whether or not students should be encouraged to "compose on the keyboard" (i.e., use word processors in writing classes), with controversy centering on the proposition that critical mental processes were activated by putting pen to paper.

Current instructional discussions focus much less on whether instructional technology "should" be utilized, and more on the various ways technology can be effectively and thoughtfully used, and how to best support faculty and students in these applications. K. C. Green's annual Campus Computing Survey offers the most complete exploration of the use of information technology in higher education. Findings from the 1997 survey revealed that infusion of information technology into instruction, and the related support issues, were the most pressing concerns of college and

university respondents, surpassing even considerations of cost and technical infrastructure management. Similarly, an analysis of the 450 program submissions for the League's 1998 technology conference revealed that submissions related to technology applications for teaching and learning outnumbered all other topics by a ratio of 9 to 1. This trend suggests that the use of technology to improve and expand instructional options will be a key focus for educators in coming years.

From the more standard use of presentational technologies like video data projectors and presentation software, to more interactive technologies such as computer-aided instruction and the World Wide Web, faculty have powerful new tools to improve student learning. Moreover, students have more access to information and instructional options than ever before. One clear example of such increased teaching and learning options is in the area of asynchronous learning. Open entry/open exit labs, interactive tutorial materials, threaded discussions, bulletin-board services, chat rooms, net meetings, and a host of similar technologies are giving students and faculty the ability to break away from the traditional time-bound, place-bound model of education—in essence offering on-demand teaching and learning. Ironically, most of these options are still referred to as "distance learning," even though they actually bring learners and teachers closer in terms of interactivity and make course content and learning services more accessible.

Technology issues identified by award-winning faculty. One of the more intriguing findings of our study is that the most commonly cited uses of technology in instruction by teaching excellence award recipients are not instructor-based at all, but rather focused on student use. **Technology for student application and production** was the number one use of technology in instruction identified by this broad cohort of teaching excellence recipients. Several faculty noted that students

can now use technology tools to engage in meaningful inquiry and to produce professional quality print publications, multimedia presentations, interactive CD-ROMs, and custom Web sites, providing learning experience for themselves and others. Faculty comments related to the use of technology for student application and production include:

- *I get students on computers to file sample incident reports in Criminal Justice class and produce formal documents.*
- *Groups work together to produce PowerPoint presentations and Web sites on course topics.*
- *Students use computer-based writing software to collaborate on composition and editing.*
- *I assign research projects that require students to give/gather information using technology.*
- *I expect all work to look professional; I have students use word processors, spreadsheets, and PowerPoint to prepare their assignments to make sure it does.*
- *I require technology use in their oral presentations.*

The second most common technology application reported by faculty was **technology for student-driven learning**. Whether constructed by faculty using authoring programs like ToolBook or LearningSpace or prepared by software or publishing houses, whether these tools were available in-class, on the Web, or in a stand-alone lab, faculty in this study identified student-driven learning as one of the primary uses of technology in instruction. Faculty consistently mentioned computer-based tutorials, Web sites, and multimedia programs to foster improved student-driven learning:

- *Students are encouraged to use "tutoring" computer programs available in our math center.*
- *Students use software that accompanies ready texts for supplementary drills.*

- *I construct puzzles on class content using a puzzle maker program.*
- *Students are encouraged to take a computerized "student behavior inventory" which asks questions about study skills, time management, test taking, etc. and gives students a printout of results and ways to improve.*
- *There are some self-paced computer programs on some of our syllabi content. Students can do these programs in the computer lab and come to class prepared to move beyond the program in a higher level of discussion on that topic.*
- *I encourage individual computer practice for licensing exams to increase comfort level with exam construction, time limits, and computer use.*

The third most common cluster of technology applications for instruction mentioned by faculty was **technology for presentation**. According to focus group faculty, technology applications for presentation–PowerPoint, ToolBook, World Wide Web, CD-ROMs, and multimedia carts–are becoming standard teaching tools necessary to reach the "MTV generation" with more stimulating visuals that bring curriculum to life:

- *PowerPoint is a God-send.*
- *I use Power Point and ToolBook presentations for all formal lectures–give students copies of outline prior to class.*
- *We put lectures and overheads on WWW.*
- *I use the Internet to present interactive material in class to spark discussion.*
- *I've found that graphing calculators in higher levels of math classes can really give the student a concrete picture of what's happening. Not a replacement of analytical skills, but a reinforcement, a "visual confirmation" of the analysis done.*
- *I use interactive CD-ROM programs in the classroom and have them available for students to use/review in the computer learning lab.*

The subsequent cluster of technology applications encompasses **technology tools to improve communication** between students and faculty and among students using e-mail, bulletin boards, listservs, electronic forums, and real-time chats. Such interactive tools give instructors new and interesting options to reach our increasingly transitory and busy students. Moreover, faculty reported using these tools to reach other educators in their discipline areas around the country, an application which helps faculty in small programs or rural areas overcome the challenge of discipline isolation. Study responses indicate that communicative uses of technology are an increasingly important aspect of instruction:

- *I use e-mail to send and receive comments and papers from students.*
- *We encourage students to use e-mail to communicate with each other and with the instructor. We hope that will foster a sense of personal responsibility for learning. It also recognizes the need for communication outside the classroom in a contemporary way.*
- *Distance learning is a marvelous tool for doing role-plays, sharing information that is real-world oriented.*
- *I use "groupware" to hold and facilitate electronic meetings.*
- *I use e-mail and subscriptions to listservs to communicate with other teachers around the world with similar teaching issues to solve.*

Focus group faculty also identified a number of **applications of technology for research and reference**. Faculty explained that they often direct students to a variety of new research and reference technologies, which they said students must master to succeed in the workplace or in other institutions of higher education. Respondents described how library databases, virtual textbooks, and the World Wide Web leave the Dewey decimal system behind and enable students to search for and manipulate information in ways only dreamed of by their predecessors. Faculty also reported how they use these research tools to keep up with current trends in their discipline area. Most responses in this cluster focus on research applications of the Internet:

- *I suggest the students use the Internet to do research for both oral and written reports.*
- *Internet sites can inform pre-law students of school programs, admission standards, law school admission test preparation course, and access to particular info from law school libraries on agency decisions and case law.*
- *Information via technology–the Internet is great to use for research purposes, especially if you teach at a branch campus that has a limited amount of library and other research materials.*
- *My students and I use Internet sites to access specific, up-to-date information on state/local government agencies, progress of legislation, and access legislator's e-mail addresses.*
- *Internet research is valuable for the students and me.*

According to our study findings, **course management and assessment technologies** are changing the way faculty organize their instructional materials and evaluate student progress. Some faculty are creating dynamic syllabi that are available on the internal college network or over the Internet. Computer-adaptive testing, virtual teaching assistants, spreadsheets, databases, and online course staging technologies are assisting instructors in managing information in new ways for themselves and for students. Some faculty suggested that grade books are giving way to on-demand performance indicators available on a Web site 24 hours a day. Given the complexities of teaching in the community college and the challenges of becoming more learning-centered, faculty suggest that these tools could not have come at a better time:

- *All class notes are available on our class Web site.*
- *Distance learning students videotape their speeches for evaluation.*
- *Students use e-mail to send in papers and receive comments.*
- *I hold virtual office hours, using e-mail and chat.*
- *I have a web site for my syllabus, I use a PowerPoint to organize my lecture material, and I use e-mail to give and receive assignments.*

- *I use QuestionMark software to design and deliver testing on line.*
- *Through computer-based testing, I can provide real-time feedback to my distance learning students.*

This study underscores the impressive range of technology tools available to educators. Nevertheless, findings suggest that even these award-winning instructors are slow to embrace and implement new technology developments, despite the growing array and significance of technology applications in community college instruction. For example, the clusters of technology for course management and technology for assessment were identified as key categories of instructional technology application by focus group faculty, but few survey respondents reported using these tools (only 31 percent and 14 percent, respectively). Moreover, several of the instructional presentation technologies mentioned by faculty involve more dated tools such as overhead projectors, VCRs, and 35-millimeter slide projectors.

Nonetheless, it appears that teaching excellence award winners are integrating technology into their instruction in growing numbers. One participant explained that faculty were slow to adopt new technology because it is seen as unreliable, a sentiment with which many in the group expressed agreement: "Only recently have many of these tools become stable enough for a teacher to trust that it wouldn't break down in the middle of class. Now I'm ready to use this stuff!" Most interesting, however, was the finding that the two most prevalent uses of technology for instruction involved the student as the primary user of the technology tool–student application and production, and student-driven learning. This observation suggests that successful community college faculty are demonstrating the finding of years of research on good teaching, which asserts that excellent faculty are those who actively engage the student in the learning process (Cross, 1998).

Learning

The Learning Revolution. O'Banion (1997a; 1997b; 1997c), Barr and Tagg (1995), and Oblinger and Rush (1997) document a Learning Revolution spreading throughout American higher education. O'Banion maintains that this revolution stems from educational reforms triggered by the 1983 National Commission on Excellence in Education report, *A Nation At Risk*, which called for action against a "rising tide of mediocrity" in American K-12 schools. He contends that in the higher education sector, the rhetoric of these reform movements has evolved through several iterations over the last fifteen years, with a great deal of activity aimed at "trimming the branches of a dying tree"–that is, fixing outmoded systems and processes. These reform efforts have now reached a turning point where educators are calling for more fundamental change–change based on placing learning first in every policy, program, and practice in higher education.

Learning has always been an unstated "given" in higher education. However, the unpronounced nature of our focus on learning may have led to what organizational theorists call goal displacement–the process whereby an organization loses sight of its key goals and becomes bureaucratic, sometimes to the point of impeding its core mission. Indeed, in a review of college mission statements of more than 100 institutions in the California Community College System, Barr (as cited in Barr & Tagg,1995) found the word "learning" was almost never mentioned.

Such a lack of focus on learning could be very costly for higher education. Oblinger and Rush (1997) assert that "[a] multibillion dollar learning industry is growing while higher education debates the issues" (p. 12). McClenney (1998) agrees, and points to the growth of such responsive, for-profit learning enterprises as the University of Phoenix–an institution with a stated commitment to anytime, anywhere learning, which has expanded

from 3,000 students a decade ago to 70,000 students on 100 campuses in 32 states today.

Students, communities, legislators, and businesses are asking community colleges for more effective, flexible, and quality learning experiences, and the traditional time-bound, place-bound, role-bond, efficiency-bound structures of higher education are in the way. Students and faculty want to be freed from fifty-minute classes, thirty-person classrooms, fixed relationships, and restricting bureaucracies. Indeed, our current system of community college education can be characterized as an industrial factory model, operating on an agrarian calendar, struggling to meet the needs of an information-based society. This anachronistic casserole of leftovers can no longer satisfy the learning pangs of twenty-first century students. Improving and expanding learning in as many diverse, innovative, and meaningful ways as possible is essential to satiate those who continue to walk through the community college's open door, hungry for relevant learning experiences to better their lives.

O'Banion (1997b) outlines the ends toward which colleges responding to these demands are moving:

> *For now, the vanguard institutions point to some key characteristics of learning-centered colleges. . . . (1) programs and services create substantive change in individual learners; (2) learners are engaged as full partners in the learning process, assuming primary responsibility for their own choices; (3) there are as many options for learning as possible; (4) learners are assisted in forming and participating in collaborative learning activities; (5) the role of learning facilitator is defined by the needs of the learner; (6) all college employees identify with their role in supporting learning; and (7) success is measured by documented, improved, and expanded learning for learners. (p. 2)*

As the Learning Revolution gains momentum, it has the potential to transform community college education, particularly when combined with the power, utility, and flexibility of information technology. Technology coupled with a sharp focus on student learning can enable community colleges to better respond to the complex and constantly changing educational needs of an information-based society.

Still, the strong emphasis on improving and expanding options for students carries with it several sensitive learning challenges. Steven Gilbert (1997), president of the Teaching, Learning, and Technology (TLT) Group calls one such challenge the "support service crisis." With students demanding more sophisticated learning options, faculty striving to apply new instructional tools, and employers seeking graduates skilled in information technologies, community colleges are finding it nearly impossible to keep their own faculty and staff up to speed. It may seem an ironic condition for an educational institution, but the learning infrastructure necessary to adequately support technology use is not in place at most community colleges. This situation exists, less ironically and more critically, however, at a time when information technology skills are imperative for our students to participate in modern discourse, to contribute to the national and international economies, and to provide for their families (Davis & Wessel, 1998).

Information technology skills and instructional applications become doubly important to community colleges striving to keep up with the Learning Revolution. Not only does information technology promise to offer students increased learning options, but it also is emerging as a vital skill needed by our students in their continuing studies and in the workplace. Indeed, information technology literacy is becoming a new basic skills requirement in many community colleges (Hooker, 1997).

Learning issues identified by award-winning faculty. Findings from our study of faculty perceptions of information technology echo the possibilities and challenges for learning associated with technology noted in other higher education discussions. A set of learning-related issues–learning for both students and faculty–emerged from responses to the question exploring what teaching excellence award recipients perceive to be the key issues (positives and problems) in the use of technology in instruction. The highest-ranking response reiterates Hooker's (1997) observation: **learning about technology itself is becoming essential, it is a "basic skill" our students need.** Faculty in this study indicate that the debate is no longer about whether or not technology will improve instructional productivity, reduce costs, or pay for itself. Information technology skills have become a core learning component that a community college student must master for successful transfer to a four-year school or into the workplace. More than 95 percent of our national sample of teaching excellence award-winners agreed:

- *The future is upon us. Every house will be connected by fiber optics in the next 5 to 10 years. Students, for employment in the future, will need to be technologically competent.*
- *With technology becoming an integral part of the industry, the students need to be introduced to these concepts before entering the work force.*
- *Students will be exposed to high tech on their first job. They must use current technology to succeed.*
- *Technology prepares students for the present and what will be dominant for the rest of their lives.*
- *We must insure that students have basic skills in technology and are comfortable before expecting more.*
- *Students, by using computers (word processing, Internet access, etc.) for my classes, learn or strengthen skills they will, in all likelihood, need in their work.*

The next core learning issue identified by these award-winning faculty members had to do with their own learning. Faculty contend that technology has become so complex and it changes so quickly that they have a difficult time staying up to speed. In terms of applying technology to instruction, most respondents agreed that **it takes a lot of time and training to use it well**:

- *Technology changes so fast that staying current is difficult.*
- *We lack of time to train to use technology. We have classes, but at times it's difficult for me to attend.*
- *I learn new software every semester, at times my head is spinning!*
- *Problem: When in hell do we have the time to produce the damn slide show?*
- *Faculty loads make it difficult to give technology the time necessary to create or use this resource to our best advantage.*
- *Unless you really understand the mechanics, you and students can get really frustrated.*

Training difficulties notwithstanding, more than 84 percent of the survey respondents agreed that **technology helps make teaching and learning more engaging**. In addition, respondents concur with Johnson's (1997) observation that, "community college students are becoming more accustomed to information technology, and they expect the associated innovations to be a part of their educational experiences" (p. 2). Focus group faculty noted that multimedia presentation technologies, interactive communication tools, student-driven learning options, and a host of other technological capabilities help students connect to learning in new ways:

- *It can capture students' interests and make otherwise dull information come alive for them.*
- *Using technology adds dimension to subject matter. Away with using only the written page for instruction!*
- *I can show invasive or private activities that students may avoid (peri care) or not have an opportunity to experience (surgery).*
- *It gives me the ability to make the classroom or the course work experiencemore exciting.*

- *It gives students the ability to "see" the material to be learned.*
- *I can show how the normal curve superimposes the histogram for some distribution. Demonstrate the probability of an event by showing the integration of the curve. Show the regression line that passes through the scatter plot.*
- *Technology opens up opportunities to bring real-time examples into classroom–e.g. in nursing, technology allows the student to "see and hear" the patient.*
- *It helps add clarity–makes visual what is abstract on the page.*

Moreover, study faculty noted that, **when used well, technology use in instruction can help facilitate different kinds of learning**. They pointed out that the connection capabilities made possible by information technology could enhance interactive and collaborative learning. Sophisticated presentation technologies and skillful management of information by instructors were reported to stimulate different learning styles and illuminate intricate or perplexing concepts. Respondents noted that students' use of the technology tools to access and analyze information helped foster critical thinking and the construction of knowledge. More than 92 percent of surveyed faculty agreed that differentiated learning was enhanced by the use of technology:

- *Technology gives students more avenues of learning–some are readers and some are watchers, and some are listeners.*
- *It is another way to teach students with different learning styles.*
- *It reinforces and stimulates all "senses" for learning.*
- *It provides different methods of instruction to students with varied learning styles.*
- *Technology allows students another avenue to learn.*
- *It allows learners to show their skills and become a peer teacher in a community of teachers/learners.*
- *It enhances learning by appealing to different types of learners.*
- *A picture is worth a thousand words–multiple methods of learning.*

Faculty asserted that effective technology use not only appeals to students with a range of learning styles, but it also **gives**

students more control of their learning, particularly through asynchronous options like computer-based tutorials and Web-supported materials. Faculty stressed that such technologies are giving new meaning to old concepts of self-paced learning:

- *Technology offers cutting-edge ways to allow students to follow and expand their own ideas.*
- *Video material can be stopped, started, segmented, or whole to make a point.*
- *Students take responsibility for their own learning.*
- *Students can take a greater part in their learning.*
- *The information age is realized in instruction–rather than being told this is the information age, students actively participate in developing the age.*
- *Students can learn at their own pace when they can access technology in and out of the traditional classroom.*
- *It allows for individual adjustment–e.g., slower students can spend time as needed in hands-on learning*
- *It allows the faster ones to move on, keep interested, get more value for the education.*

One major learning challenge associated with the powerful learning options offered by information technology that was repeatedly emphasized by study faculty is that **some instructors are tempted to use technology for its novelty, rather than utility**. Respondents stressed that without a sharp focus on its intended purpose of enhancing learning, technology use can easily deteriorate into what one faculty member called, "the gee whiz factor," with little or no learning to show for the hours of effort:

- *Too much "entertainment" and "fun" may actually slow down or minimize serious learning or just "miss the point."*
- *There may be more focus on gadgets than on students and learning.*
- *Overuse of technology becomes a crutch to teaching rather than a supplement to or addition to taught information.*

- *Too many instructors try to use technology for the sake of using technology. If it will not enhance the learning, don't use it.*
- *Support is more concerned with technological efficiency than effectiveness for teaching. It's simply technology for the sake of technology.*
- *Students can be dazzled by the method and ignore the content.*

It is encouraging to hear the voices of faculty ring with the language of learning. As the Learning Revolution spreads throughout higher education, we can be confident that our best faculty care deeply about how to use technology to improve learning. Their comments reassure us that, when used well, technology is a formidable learning tool. However, their comments also remind us that the important phrase to remember is, *when used well.* Information technology use in education–even when highlighted by elaborate Web sites, chat rooms, and interactive video–neither equates to nor automatically creates good teaching. In fact, as Terry O'Banion articulates this challenge, "Technology has the powerful potential for extending and expanding really bad teaching, poor instructional design, and outdated content." Our challenge in applying technology to instruction, then, is to keep a strong focus on learning processes and outcomes. When we can document improved and expanded learning for our students, we will know technology use in education is working.

Community

"Putting the big things in first." Voices from exemplary faculty in this study repeatedly call on technology advocates to face thoughtful concerns about potentially negative aspects of technology, in particular technology's capacity to drive our educational communities apart rather than bring us together. At the 1997 Teaching, Learning, and Technology Roundtable Institute, Ed Hollowell, a professor and psychiatrist at the Harvard Medical School, offered a keynote address on maintaining the human touch in the information age. Hollowell contends that in this age of fast-

pace communication and high-impact multimedia, we have more contacts than ever before, but less true interaction. In his medical practice he has found that most of his clients suffer from a lack of connectedness, a lack of meaningful contact with good friends, family, and social organizations. Hollowell joins other thoughtful theologians, philosophers, educators, and researchers concerned about the effect of technology on the human mind, body, spirit, and community (e.g., Healy, 1994; Mander, 1992).

Hollowell relates the story about a professor demonstrating the concept of being "full" to a physics class. The professor places a number of large rocks into a cylindrical container until it can hold no more and then asks the class if the container is full. The cylinder looks full, so the class casually responds in the affirmative. But, the professor takes a bucket of gravel and pours it into the container until the smaller stones settle into the spaces among the larger rocks. He then stares at the class as they looked a bit stunned at missing the obvious, and asks again, "Now, is it full?" The class again replies, "Yes." Then the professor takes out a bucket of sand and pours sand into the seemingly full container, and the sand weaves through all the crevices and up to the top of the cylinder. He then winks at the class and repeats his question. The class sighs somewhat hesitatingly, "Yes, now it's full." But, once again, the professor reaches down, this time producing a bucket of water, which he slowly pours into the container until it gurgles to the cylinder's lip. He places the four empty buckets next to the cylinder and smiles at the class, "You see, we can fit all this into one space. But, it is not as easy as it might seem. The trick is to remember to put the big things in first."

Hollowell's point, of course, is that we can use the various exciting forms of information technology, so long as we remember to "put the big things in first." We need to remember our central purposes of building communities of learners in our classrooms, real or virtual, and fostering meaningful human contact and relationships that support student learning. Without a concerted

focus on the "big things" technology is supposed to be helping us achieve, the minutia can dominate. The water and sand–the ubiquitous e-mail, voicemail, threaded discussions, and Web sites–can overtake the space that is meant for the big rocks in our colleges, such as relationships with one another and with our students, a sense of connection to the institution, and, most important to our discussion, learning.

As educators we intuitively know the value of these relationships to learning. We do not expect to hear a student wax poetic about how a software program, network infrastructure, Web site, or new PC has changed her life or inspired his educational journey. Students save such praise for people–faculty, counselors, peers, family members–who connect with them and touch them with ideas or emotions that make a difference to them as individuals. It is with this recognition that Hollowell believes we can overcome the negative influence of technology on human development. Put simply, he argues that we must openly address the human side of the learning process and engage technology to improve learning within more thoughtful frameworks of personal concern, connection, and community.

Community issues related to technology. Faculty in this study unearthed a number of issues that point directly to community, a notion that has been at the heart of the community college enterprise since its inception. Faculty identified a series of topics they felt must be considered for a college community to effectively embrace, and for students to be well served by, technology. The first of these is the acknowledgment that **technology for instruction can get very expensive.** There are serious budgetary implications for technology that can test the most cooperative and closely knit college communities. Faculty recounted tales of technology "money pits" and disputes over allocations of limited technology resources among college areas that stressed institutional relationships as well as budgets.

- *Training needs to be a budgeted item just like equipment and software.*
- *There are not enough computers! My office mate and I share one, and we both use PowerPoint!*
- *There is serious frustration in not having the resources to create what I know can be done.*
- *Our classrooms are built for the 60s, not the 90s or the 21st century.*
- *Computer labs are expensive to set-up and become outdated the day of the grand opening (they're also expensive to maintain).*
- *There is unequal access to technology–some faculty have the latest computer and printer in their private office, others are in a broom closet with three other faculty and antiquated technology where they have to beg and borrow computer time here and there, stopping and starting their work and going from one word processor such as WordPerfect to another such as Word on a different computer.*

In addition, faculty in this study remind us not to leave anyone behind in our zeal to move forward with technology. Study participants point out that community colleges can be the gateway to information technology inclusion for all citizens, much like public libraries were for the printed book, but we must face the challenge that **our students do not have equal access to technology**. Faculty contend that not only must we give students access to e-mail and the Internet, we also must offer basic skills necessary to bring the economically and technically disadvantaged into the Information Age. Respondents challenge us to work to ensure that all community college students can benefit equitably from the information technology infrastructures we develop:

- *Not all students have access to computers/Internet either on or off campus.*
- *Using e-mail with students allows them to communicate with me outside their classroom both locally and globally, but they have to have e-mail to participate.*

- *WE CAN'T LEAVE ANYONE OUT–what about those students who don't have computers!?*
- *The Internet is great, if you can get to it.*
- *We need technology accessibility for anyone in the world.*

Faculty also point to **ubiquitous hardware and software problems** that frustrate educators trying to adapt to new technologies. Respondents underscore the human implications of technical instabilities and failures and describe how these add stress to the college community. If challenges of technology unreliability are not addressed, focus group faculty explained, selling instructors on the value of using technology in the classroom will be difficult at best.

- *Hardware/software problems are very time consuming and distracting.*
- *Classroom use of technology demands a back-up plan, as it is prone to crashing.*
- *You must plan ahead and be prepared for the unexpected–you will have technology problems.*
- *A lot of the "bugs" have not been worked out–valuable class time can be lost because equipment, computers, etc., do not function properly.*
- *Damned stuff does not always work.*

The constantly changing and spontaneously crashing hardware and software does little to help confront another key issue raised by faculty, **fear and resistance about the use of technology**. Resistance to change is a formidable challenge for an organization undertaking any major new initiative, and often such resistance finds its basis in fear. As study participants related, technology conjures a number of fears for faculty: basic technophobia, fear of appearing ignorant in front of peers and students, fear of failure when relinquishing proven traditional teaching approaches, fear of loss of classroom control. And, students share many of these fears. Further exacerbating the anxiety surrounding technology use are divisions in the college

community along lines of technology advocates and resistors. Study respondents note that **"true believers" can cause problems** by "promising the moon in a minute," when most faculty are struggling just to get the technology to their class on time. Moreover, the technologically savvy sometimes are condescending toward technical neophytes or contemptuous of those who are thoughtfully critical of technology. Challenges related to fear and resistance of technology were reflected in a number of faculty comments:

- *Instructors refuse to change with the times.*
- *Students excited about technology may have frustrations because instructors are behind the times.*
- *There is resistance to learning new techniques–both students and faculty, but more faculty.*
- *Some teachers are still scared.*
- *Too many colleagues fear technology.*
- *Technology frightens students with little or no exposure.*
- *Technology can be intimidating to the nontraditional student. This intimidation could hurt the learning. It has been my experience that older women are terribly afraid of computers.*
- *One problem is techno-able folks patronizing the techno-novice. No one wants to learn something they have been made to feel inadequate about.*

The final and most substantive community-related technology issue revolves around **maintaining the human touch while using technology in instruction**. Focus group faculty noted that in our complex community college context–characterized by at-risk, part-time, older, or single-parent students interacting with our multidimensional mission to prepare college transfer students, produce technical workers, and provide training for the local workforce–our struggles with technology and its effectiveness in instruction are unique in higher education. This context makes it imperative that we carefully craft our technology-based communications. One unintended critical inflection read into an e-

mail sent to an unsure community college "virtual student" can quickly turn him into a nonexistent student. Moreover, the exemplary faculty in our study were quick to explain that they have come to rely on nonverbal communication–the confused look, the nodding head, or the unfocused stare–as their gauge of student learning and teaching effectiveness. They expressed concern about losing these human touches and wondered, for example, "What are the telltale communication signs of confusion or effectiveness in an online course?"

Focus group participants discussed the importance of breaking through the impersonality of technology to cultivate a sense of caring and community. Concern for the "human" issues related to the use of instructional technology was a key category identified by focus group faculty, a priority identified by more than 80 percent of survey respondents:

- *On Wednesday of this week, I shall be teaching my first e-mail class. I worry about the lack of face-to-face (i.e., fully human) interaction.*
- *Technology can never replace the human need for warmth and compassion given by a caring teacher.*
- *Technology can actually get in the way of teaching and learning. You can rely on it so much you forget how your students are responding or reacting.*
- *Students (and some instructors) are fearful that the environment will become too depersonalized. Used inappropriately technology can be cold, isolating.*
- *Technology should enhance the ability of faculty to draw students into the circle of learning. The most important factor in instruction is, I believe, the acting/exhibitionist piece of good teachers which catches the students and makes them yearn to hear/learn more. Technology shouldn't be in the way.*
- *In an ITV classroom, discussion is hard. It is stilted and shortened and people don't "connect" to you or to each other in the same way.*

- *You lose the human element in some cases. I like the personal interaction with students, seeing their bright faces when something is clear and their blank stares when something isn't.*
- *Teaching emanates from love, which cannot be excluded from the process. Technology per se cannot build that special bridge between teacher and student that results from learning.*

Putting a Little TLC into Community College Instruction

This study has several apparent limitations. First, the faculty chosen as "teaching excellence award recipients" are members of a purposeful sample, but the criteria for selecting these exemplars of "teaching excellence" are unique to each of the NISOD member schools. Nevertheless, this variance in selection criteria for award recipients may, in fact, lead to a better reflection of the diversity of community college teaching excellence in our findings.

In addition, personal priorities or interests may have biased the affinity diagramming process that engaged faculty participants and the research team. While every attempt was made to include all participants equally in this process, strong personalities always exist in groups, which can influence such activities. Finally, the response rate on the quantitative survey is small (24 percent). However, since the survey did not include comparative statistics and attempted to capture as much of the population as possible (rather than using a representative sampling technique), this response rate is admissible and is further offset by the high number of respondents (1,670).

These and other limitations notwithstanding, the study reported here is a broad-based and comprehensive attempt to capture the perspectives of community college teaching excellence award winners regarding how they use technology and the key issues they perceive to surround the use of these increasingly significant tools. Bringing these **technology** tools to bear to

improve and expand **learning**, while maintaining a strong sense of **community**, is the challenge we hear in these faculty voices.

As noted, this study cohort was not composed of technology "true believers." Nonetheless, these faculty members used information **technology** in numerous creative ways. Their most prominent applications engaged students as active participants in information technology usage–an approach reported by successful faculty across discipline areas. Encouraging students to use technology to produce coursework and to apply concepts was first on the teaching excellence award recipients' lists of technology uses, followed closely by promoting technology for student-driven learning. Faculty also described widespread use of technology products to enhance and expand their instructional presentation capabilities, helping "bring [instructional] material to life" and stimulate different types of learners (e.g., visual or auditory learners). Next, faculty reported using technology to improve their communication with students and to facilitate interactions among students through e-mail, online chats, and threaded discussions. Faculty also described how new technology applications for research and reference have enabled them and their students to obtain the most current information easily and rapidly. Finally, faculty reported that technology tools for course management and assessment are leading them to experiment with new organizational and testing strategies.

A striking characteristic of the faculty participants in this study was their thoughtfulness surrounding sensitive issues regarding technology uses in instruction. Mirroring the focus on **learning** spreading throughout higher education, this cohort provided several notable insights into core learning issues. First, they agreed that learning with and about technology is becoming an essential "basic skill" for community college students. They pointed out that when students leave our institutions, they are entering a world of work or university transfer that uses

technology at almost every turn. We do our students a serious disservice if we do not incorporate technology into their educational experiences.

Although dedicated to using these new tools to enhance student learning and to prepare students for successful transition into work or the university, faculty in this study identified a number of challenges hampering the meaningful integration of technology into instruction. A prevalent response among this cohort was that, despite claims of user-friendliness and ease of use, effective use of technology in the classroom requires a significant commitment of time and training. If used clumsily with too little preparation or training, or if combined with already poorly conceived instruction, faculty felt that technology might in fact inhibit learning. But when used well, they agreed that information technology could make teaching more engaging and facilitate different kinds of learning. Moreover, faculty emphasized that effective use of instructional technology can give students more control of their learning by offering them flexibility to learn in new and powerful ways outside of the classroom, on their own schedules.

These faculty clearly assessed the use of information technology to facilitate learning as vital, but suggested that technology use must be undertaken with consideration of several key issues that affect the college **community**. They reminded us that information technology remains an expensive educational investment that can lead to conflict over expenditures, resource allocations among divisions, and cost-to-benefit assessments. In addition, faculty stressed that not all students (or faculty) have equal access to technology, a situation with the potential to create a technology-based caste system within our institutions. In addition, findings suggest that technology hardware and software continue to malfunction frequently enough to raise the tempers and frustrations of faculty and students, which does little to

reduce the fear and resistance that surround technology use in education. All these challenges are exacerbated by a core of true believers who advocate for the hegemony of technology, sometimes without regard for the insightful technology critic or sensitive technology novice.

Still, these award-winning faculty acknowledge the inescapable significance of technology to society and education, and they challenge us to overcome the shortcomings of technology applications and to strive to maintain the caring connection to the students we seek to empower through education. The men and women who so candidly shared their experiences and perspectives in this exploration of the intersection of technology and community college instruction remind us that while using the great new technology tools, we must not lose sight of the "human" things that faculty do to touch students each day, in and out of the classroom.

Suggestions for Putting TLC into Instruction

In closing, we offer a collection of suggestions for community and technical college educators to consider as they grapple with the issues related to technology, learning, and community that derive from the findings of this study. No single institution likely will find all of these proposals to be feasible or even appropriate. Nonetheless, judging from the responses and experience of this spectrum of community college teaching excellence award winners, any institution would be well served to bring together key personnel to give these suggestions serious consideration.

Technology Suggestions

1. Ensure that students have access to the technology necessary to produce their work and learn how to learn. Word processing, presentation software, spreadsheets, e-mail accounts, and Internet access are a minimum for all students to engage their educational

opportunities on equal footing. Optimally, use of these technologies should be encouraged in most classes (i.e., "technology across the curriculum").

2. Expand access to asynchronous, technology-enabled learning options, such as Web tutorials and computer-based training, to allow students to drive their own learning. Allowing students to interact with learning materials at their own pace provides flexibility for individual learning styles while developing useful technology skills.

3. Provide access for faculty to the software, hardware, and training necessary to make effective use of presentation technologies in their classroom. Faculty in this study contend that visual, multimedia presentation technologies can "bring instruction to life" .

4. Encourage technology applications that increase and improve communication between faculty and students and among college personnel at-large. In the community college context of increasingly busy and transitory students, flexible communication media are essential for bringing working students into contact with instructors. Effective communication technologies are particularly valuable tools for part-time faculty and their students. Few part-time faculty have offices or voice mail on campus, and giving them college e-mail accounts greatly enhances their connectivity with students and colleagues.

5. Foster the use of the Internet and other technology-based research tools in instruction. Build curricula that encourage students to access research materials using technology. In addition, set a goal of providing all faculty members desktop access to the Internet to facilitate research in their discipline areas. Teaching five to six classes per term leaves little time for

disciplinary upgrade; bringing the needed information to faculty desktops seems the least we can do.

6. Explore the many uses of technology to facilitate course management and assessment. The better tools faculty have to manage the increasing number and diversity of students coming their way, the better their instruction will be.

Learning Suggestions

1. Develop an information technology literacy component in your programs. Faculty in this study suggest that we do our students serious disservice by failing to recognize that the use of technology is a new "basic skill." Moreover, consider developing a basic information technology literacy component in your hiring and evaluation procedures for faculty. Perhaps we do our faculty an even greater disservice by not setting this standard for them.

2. Implement strategies to provide the necessary time and training to enable faculty to use technology effectively. This is by no means a simple suggestion in terms of logistics or budgeting. However, we can no more expect our faculty to make good use of technology without appropriate learning opportunities than we can expect our students to pass the final exam on the first day of instruction.

3. Catalog and showcase the different ways that instructors are using technology to improve instruction. Develop an institutional Web site that features model instructional uses each month. Develop teams for sharing experiences in applying technology in instruction, along the lines of the Great Teacher Seminar framework.

4. Enlist faculty who are further along on their technology journey to serve as mentors. Develop or expand teaching and learning centers to facilitate quality use of technology. Remember the maxim from faculty in this study, that technology can make instruction more engaging *when used well*. Encourage technology uses that appeal to different learning styles, uses that can be documented to improve learning.

5. Foster technology applications that encourage students to take control of their learning. The most important contribution of instructional technology in the Information Age may be to empower and motivate students to take responsibility for their own learning.

Community Suggestions

1. Deal with the expense of information technology openly and honestly–avoid "it will save us money in the long run" rhetoric. Make decisions about technology purchases based on learning and community goals. Develop as many alternative and stable funding strategies as possible to bring technology to the college without sacrificing other mission-critical services.

2. Strive to provide increased technology access and technical support, in particular, to students and staff who do not have technology available at home.

3. Avoid major system upgrades or equipment changes during pressing times in the academic calendar. Just before fall registration may not be the best time to implement a new administrative software package or instructional scheduling program.

4. Develop surefire strategies to respond promptly to hardware and software breakdowns in instruction. At the same time, encourage faculty to develop contingency plans for those times when *nothing* will make the system work.

5. Listen respectfully to those expressing resistance to technology. Do not dismiss the intelligent critics, as they sometimes can save thousands, even millions, of dollars in inappropriate hardware and software purchases. Nevertheless, understand that some individuals will never accept technology and will fight for its demise at every turn. Search for balance, and always attempt to approach technology decisions thoughtfully, allowing for balanced contributions to the discussion. Beware of placing vocal "true believers" on the vanguard of your technology implementation efforts, as they can be perceived as patronizing or overzealous by those accepting technology at a slower pace.

6. Never lose sight of the essential human touch in instruction. People reach other people and change lives through teaching and learning. Remember that technology is merely the medium, a tool of our trade. As we move deeper into the Information Age, we cannot lose sight of this reality nor emphasize enough the need for caring and connected instruction. Community colleges traditionally have taken a holistic approach to learning and human development. To help balance detrimental effects of the ubiquitous technology in our lives, community colleges may be challenged with reinvigorating their emphasis on wellness and community.

In a caring educational community, learning and student success are at the center of all institutional processes, and technology is put in its place as a creative servant to these ends. Indeed, as Pat Cross (1998) points out, creativity and innovation

are flourishing throughout today's community college. And, according to the faculty whose perspectives enliven this study, a focus on integrating TLC–**technology, learning, and community**–into instruction, can help us realize the promise of a "new spring" of educational opportunities for community colleges. These faculty voices encourage us to bring similar thoughtfulness and energy to all of the challenges that face us in the new millennium.

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APPENDIX A

Tables 1 and 2 (Appendix A) present a summary of the qualitative and quantitative responses to the two questions posed to study participants regarding the use of information technology in community college instruction. Each table highlights one technology-focused question and the thematic clusters of responses derived from the focus groups, with an example comment from that cluster. To the left of each category and comment are the Likert scale responses from the national survey and the mean response for each comment. To the right is the weighted ranking of survey responses. Focus group responses are listed in order of overall priority ranking of survey responses.

TABLE 1. Summary of Findings for Question One

1: In what ways do you use information technology in instruction?									
YES! 1	Yes 2	Yes 3	Neutral 4	No 5	No 6	NO! 7	Mean Score	Focus Group Responses *(categories and sample responses)*	Rank
19%	19%	21%	14%	15%	6%	6%	3.3	**Technology for student application/ production**- *"I expect all work to look professional and have students use word processors, spreadsheets, and PowerPoint to prepare their assignments to make sure it does."*	1
18%	18%	21%	15%	15%	6%	7%	3.4	**Technology for student-driven learning**- *"There are some self-paced computer programs on some of our syllabi content -students can do these programs in the computer lab and come to class prepared to move beyond the program to a higher level of discussion on that topic."*	2
17%	13%	18%	15%	18%	9%	10%	3.7	**Technology for presentation**- *"I like PowerPoint to create classroom presentations and student handouts- it's been a God-send."*	3
20%	13%	17%	11%	16%	9%	14%	3.7	**Technology for communication/ interactions**- *"My students can reach me 24 hours a day for chats via e-mail or fax."*	4
13%	16%	24%	14%	17%	8%	8%	3.6	**Technology for research and reference**- *"I assign Internet research."*	5
8%	9%	14%	12%	29%	12%	16%	4.5	**Technology for course management**- *"I put my syllabus online, collect papers via e-mail, and produce grade sheet on spreadsheets."*	6
3%	4%	7%	17%	33%	16%	20%	5.0	**Technology for assessment**- *"I use QuestionMark software to design and deliver testing online."*	7

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TABLE 2. Summary of Findings for Question Two

2: What do you see as the key issues (positives or problems) in the use of technology in instruction?

YES! 1	Yes 2	Yes 3	Neutral 4	No 5	No 6	NO! 7	Mean Score	Focus Group Responses *(categories and sample responses)*	Rank
50%	29%	16%	4%	1%	0%	0%	1.8	**It's becoming a 'basic skill' our students need**–*"Students will be exposed to high tech on their first job. They must use current technology to succeed."*	1
35%	30%	25%	5%	4%	2%	1%	2.2	**It takes a lot of time and training to use well**–*"[Technology] changes so fast that staying current is difficult."*	2
33%	23%	25%	12%	4%	2%	1%	2.4	**Need to keep the human touch**–*"With Internet courses and interactive TV, students can sometimes feel alienated."*	3
26%	33%	25%	12%	3%	1%	0%	2.4	**It can make your teaching more engaging**–*"The ability to make the classroom or the course work experience more exciting."*	4
31%	37%	24%	6%	1%	0%	0%	2.1	**Can help facilitate different kinds of learning**–*"It gives students more avenues of learning–some are readers, some are watchers, and some are listeners."*	5
37%	27%	22%	9%	3%	1%	1%	2.2	**It can get very expensive**–*"Computer labs are expensive to set-up and become outdated the day of the grand opening (also expensive to maintain)."*	6
30%	24%	22%	8%	8%	4%	4%	2.7	**Students don't have equal access to technology**–*"Not all students have access to computers/Internet either on or off campus."*	7
21%	25%	30%	14%	7%	2%	1%	2.7	**The hardware and software can be problematic**–*"Hardware and software problems are very time consuming and distracting."*	8
22%	33%	26%	15%	3%	1%	0%	2.5	**Gives students more control of learning (e.g., asynchronous learning)**–*"Students can can work in self-directed fashion–it bridges time and space gaps."*	9
16%	22%	28%	18%	10%	4%	2%	3.1	**Some are tempted to use technology for the novelty, not the utility**–*"More focus on gadgets than on students and learning."*	10
15%	25%	29%	13%	11%	4%	3%	3.0	**There's a great deal of fear/resistance around the use of technology**–*"Resistance to learning new techniques–students and faculty–but more faculty."*	11
10%	17%	27%	29%	11%	4%	2%	3.4	**True believers can cause problems**–*Techno-able folks patronizing the techno-novice. No one wants to learn something they've been made to feel inadequate about."*	12

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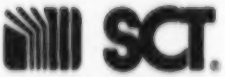

Online access to information is exploding. With new World Wide Web access, enterprisewide administrative computing solutions, and distance education technology, students and faculty are now even more closely linked. These new concepts present opportunities for institutions to reach beyond the bounds of traditional methods of delivering services and learning.

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